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Plastic debris ingested by a Blainville's beaked whale, *Mesoplodon densirostris*, washed ashore in Brazil

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Concerns regarding the impact of man-made debris in the marine environment have been increasing (Day & Shaw, 1987; Laist, 1987; Ribec *et al*., 1992; Ryan, 1994). Pollution in the form of plastic debris has been recently recognized as a major threat to marine wildlife, in terms of ingestion and entanglement (Shomura & Godfrey, 1990). At least 177 species of marine vertebrates were reported to ingest marine debris (Laist, in press). Compared to entanglement, the incidence of marine debris ingestion is much more frequent, occurring in almost 100% of sampled individuals of some seabird species (Ryan, 1994). Although marine debris has been found in the stomach of cetaceans (Barros *et al*., 1990; Laist, in press; Tarpley & Marwitz, 1993; Walker & Coe, 1990) as well as other marine vertebrates worldwide (Ryan, 1994; Shomura & Godfrey, 1990), ingestion of debris has been rarely reported in Brazilian waters. In these few cases only coastal species such as the tucuxi, *Sotalia fluviatilis* (Geise & Gomes, 1992) and the franciscana, *Pontoporia blainvillei* (Pinedo, 1982; Secchi & Bassoi, unpubl. data), have been involved.

On 27 February 1993, a 419 cm adult female Blainville's beaked whale was found washed ashore in an advanced state of decomposition at Mar Grosso Beach (32°07′S–52°02′W), São José do Norte, southern Brazil (Fig. 1). The skull was collected and deposited in the collection of the 'Museu Oceanográfico' in Rio Grande, Brazil (MORG 0094), and the digestive tract was analysed. Cranial morphology allowed positive identification to species. The third condyle mentioned by Ross (1984) and Mead (1989) was observed in the skull of this specimen. Although this feature is also present in *M. grayi* and *M. layardii*, the alveolus positioned posteriorly to the mandibular symphysis is a characteristic only shared with *M. ginkgodens* and *M. stejnegeri* (Mead, 1989; Jefferson *et al*., 1993). This last character is diagnostic for *M. densirostris* in this region, because these two species do not occur in the South Atlantic. In addition, the high arching lower jaw observed in the specimen MORG 0094 is also diagnostic for *M. densirostris* in the South Atlantic (Mead, 1989). Sex determination was confirmed based on the unerupted teeth and the unfilled mesorostral channel (Ross, 1984).

The stomach analysis revealed the presence of a blueish bundle of plastic threads (Fig. 2), occupying a large part of the main stomach chamber (volume of 35 cm^3 in terms of displaced liquid). Both stomach and intestines were completely free of parasites as well as food remains and faeces, indicating that the whale had not fed for some time. For some species ingestion of marine debris seems to occur primarily as a result of mistaking debris for potential food items (Ryan, 1994). However, Walker & Coe (1990) suggested that mistaken ingestion of debris due to its resemblance to preferred prey is unlikely to occur in odontocete cetaceans because of their echolocation capabilities. For the beaked whale we observed, it seems possible that the debris may have been ingested incidentally while a prey target was accidentally or intentionally in close proximity to the plastic threads; naturally occurring disease factors may have predisposed the animal to ingest the abnormal object; the whale was not echolocating at the moment when the debris was ingested; or the whale confused the blueish floating plastic with a squid—one of its preferred prey (Ross, 1984; Mead, 1989). The ingested plastic may have resulted in a false sensation of satiation for the animal, which could have reduced the whale's appetite and meal size. In turn, this would have compromised the energy consumption and health of the animal and subsequently (at least indirectly), lead to the death of the whale. According to Walker & Coe (1990) a high incidence of

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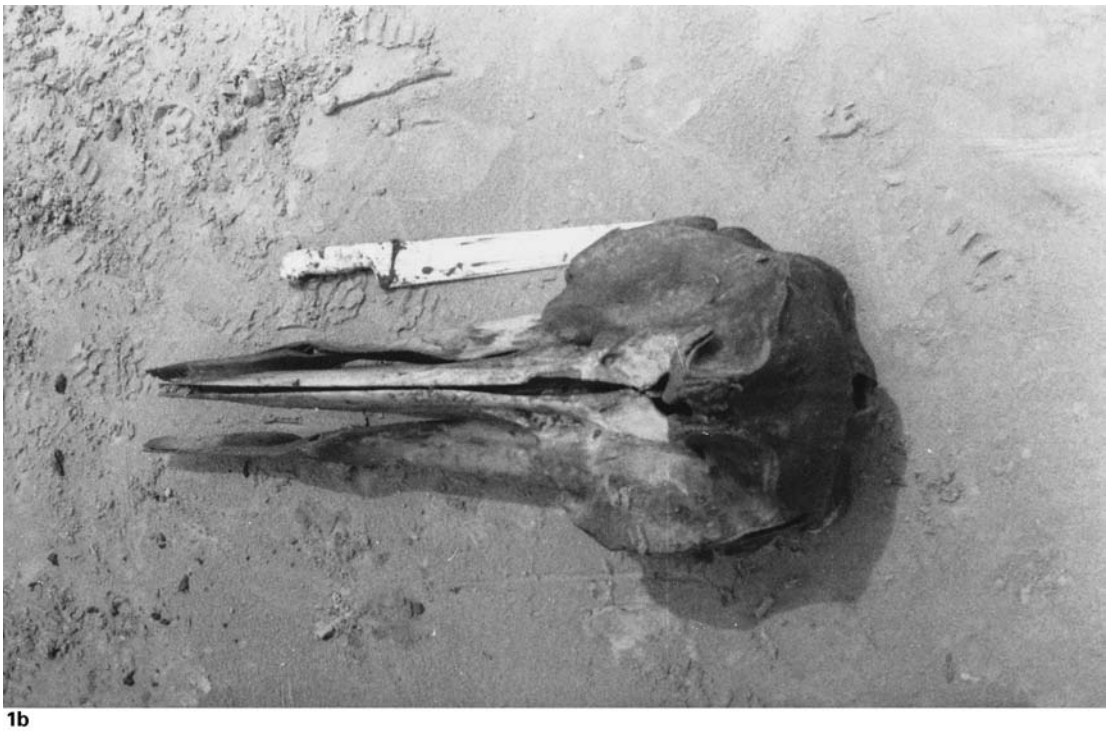

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Figures 1. (a, b) Carcass and skull of a female Blainville's beaked whale stranded in southern Brazil.

Figure 2. Details of the bundle of plastic thread found in the stomach of the Blainville's beaked whale washed ashore in southern Brazil.

pre-existing brain parasitism and the absence of debris-induced gastrointestinal pathology in most whale strandings suggest that the marine debris is not a major cause of cetacean strandings, however, debris ingestion in singly stranded cetaceans may be, in a large percentage of the cases where it occurred, part of the stranding syndrome.

Even though the distribution of siphiids is poorly known, *M. densirostris* is described as having one of the broadest ranges of all mesoplodonts (Mead, 1989). The relative paucity of stranding events, however, suggests that this species is probably found offshore (Mead, 1989). In fact, Moore (1966) suggested that the distribution of Blainville's beaked whales is farther offshore than other *Mesoplodon* species of the North Atlantic (e.g. *M. bidens* and *M. europeaus*). This animal represents only the third record of the species for the western South Atlantic. The two previous strandings of Blainville's beaked whales were reported by Castello & Pinedo (1980) and Simões-Lopes & Ximinez (1993), both in southern Brazil.

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